GEORGE G. BAFFOUR, Ph.D., *Associate Professor, Howard University*
CHARLES L. BETSEY, Ph.D., *Professor, Howard University*

Human Resources Management and Development in the Telework Environment

Introduction

Telework has been defined as the use of telecommunication-related technology to conduct work in distant locations (Mokhtarian 1991). Telework activities include teleconferencing, on-line database searches, facsimile transmission, cellular phone calls, electronic mails, and the use of ordinary telephone. While this definition of telework suggests the use of telecommunication equipment, it does not tie the teleworker to any specific location. This footloose definition of telework is problematic because it prevents easy assessment of the direct influences of the practice on work processes in organizations and on public policy issues such as transportation and pollution. Because of this problem, there is the need to re-define telework to allow researchers to focus more directly on the implications of the effective utilization of telecommunications in conducting work outside traditional offices, on management and public policy. We do so by describing other related but different terminology in the literature: remote work, and telecommuting.

Remote work is defined as "work done by an individual while at a different location than the person(s) directly supervising and/or paying for it." (Mokhtarian 1991, p. 4). Remote work, unlike telework, presumes that the employee is in fact working outside the conventional office where the supervisor or the one paying for his services operates. However, remote work can take place without the use of telecommunication technology.

Telecommuting on the other hand is defined as working outside the conventional office using telecommunication technology in lieu of the employee's physical presence in the conventional office (Nilles 1988). Based on these definitions, only "telecommuting" requires the employee to simultaneously work outside the conventional office, and use telecommunication technology to do the work. To assess the impact on organizational management and public policy of working outside conventional offices and using telecommunication technology to do the work, requires an inclusive concept.

Consequently, in this paper, we define telework as working outside the conventional office using telecommunication-related technologies to interact with supervisors, coworkers and clients. Telework defined this way is synonymous with telecommuting as defined in the literature. Thus telework is simply the substitution of information technology for work related travel; moving work to people instead of moving people to work (Nilles 1998 p. 1).

This project was funded under a purchase order contract from the Office of the Assistant Secretary for Policy. Points of view or opinions stated in this document do not necessarily represent the official position or policy of the Department of Labor.

Growth of Telework and its Benefit to Organizations

According to the U.S. Bureau of Labor Statistics, approximately 20 million non-farm employees worked at home in 1991. Of this number, about a fifth or 3.7 million workers were paid specifically for work at home. A more recent estimate by the International Telework Association & Council (ITAC) indicates that there were 19.6 million teleworkers in the United States in 1999 and that the number is growing at the rate of about 10% per year. While the number of teleworkers is increasing, a 1999 survey done in the state of Washington by Sundel Research Inc. for the Washington State University energy program indicates that telework is a much more viable option for large businesses than small businesses. In addition, the survey found that about 66.6% of the firms surveyed had no telework programs. These firms claimed that they do not have telework programs because their businesses are not conducive to telework. However, of the 63 business types interviewed in this survey, 70% had at least one business with a telework program. This indicates that telework can in fact be adopted in some functional area in almost all businesses, and that a majority of firms have not adopted telework not because their businesses are not conducive for telework but rather because of other more subtle reasons.

Telework is seen as providing benefits for the organization and the employee (ETO 2000; Bresnahan 1998). The potential benefits to organizations include increased productivity due to flexibility, time saved from commuting, and fewer interruptions when working at home. A recent estimate puts the average dollar value of productivity gain due to telework at $685 per worker per annum (American Management Association 2000). Other potential benefits include cost savings due to reduced expense on office and parking spaces, reduction in turnover due to flexibility for workers, reduced sick leave and health costs, and elimination of tardiness. In another recent survey on the cost savings of telework[1] sponsored by AT&T, it was found that employees who telework can save their employers $2,086 each in reduced absenteeism and $7,920 in reduced turnover costs. A study conducted by FIND/SVP and Joanne H. Pratt Associates for AT&T in 1997 found that the employees' benefits included increased satisfaction with their jobs, accomplishing more with less; increased control over their personal lives as well as increased autonomy and responsibility in their jobs. The increased autonomy and responsibility led to increased job satisfaction as well as increased level of motivation that in turn can lead to increased productivity. Telework also has the potential to reduce or eliminate both the emotional and monetary costs associated with commuting to and from work.

It is clear that telework is gaining ground and its potential effects on organizational and individual outcomes are positive. However, the pace of adoption is not as brisk as expected, and there is evidence of many failures in the adoption of the practice in firms (Bresnahan 1998). Many companies that have adopted telework have failed to realize the anticipated gains.

When one looks carefully at the claims of increased productivity it becomes clear that some of the gains may be illusory. A review of 18 studies that reported gains in productivity from telecommuting found few in refereed journals and only one that used a control group. The definition of productivity used varied across the studies. Many studies were based on self-reports by employees and one study found that employees and their supervisors came to substantially different conclusions about the size of productivity gains.[2]

Of course, the failure of these programs to achieve productivity increases may not be due to inherent problems associated with telework per se, but to the ways in which the programs were implemented (National Research Council 1995). Implementing telework without changing some traditional management practices might inevitably lead to failure. This is so because telework challenges some old established assumptions underlying the management and structure of organizations. Traditional management practices have come to view organizational designs with more spatially dispersed personnel or facilities as an unacceptable form of structure that is more difficult to coordinate and control. However, advances in telecommunication technology such as videoconferencing can allow concurrent interaction among dispersed personnel making coordination and control much easier.

The purpose of this paper is to summarize the job analysis, staffing, supervision, training and compensation practices identified in the literature as being necessary for the effective implementation of telework in organizations. The findings suggest that the performance enhancement potential of telework will be missed if implementation is not accompanied with appropriate human resource practices. While case studies and economic theory indicate the nature of these best practices, there are no reliable empirical studies that validate them.

Job Analysis

Traditional job analysis is a systematic investigation of the content of jobs, the circumstance in which the job is carried out and the qualifications needed to carry out job responsibilities (French 1990). The content of jobs, usually called the job description, describes the tasks that are performed. Every task requires an employee to function in relation to people, data, or things (Dictionary of Occupational Titles 1991). For instance, a task may require the employee to analyze or compute data, instruct or serve people, or tend a machine. Job descriptions are used for determining the qualifications needed by workers to perform the job. These qualifications or job specifications are used in the selection process to identify prospective workers to fill positions.

While a traditional job description may not necessarily assume that workers will be working in a traditional office, it only focuses on what activities will be performed, how they will be performed, and why. It does not specifically address the issue of where the activity will take place. However, with the advances in telecommunications, some jobs can be performed outside the traditional office such as in employee homes, while some can only be performed in the traditional office or in a fixed location. This implies that in addition to matching the job description with the qualification of a prospective worker, employers hiring teleworkers may first need to determine if the job is "teleworkable" or that it is location-dependent and requires the incumbent to work in the traditional office. If the work can be performed outside the traditional office, then the prospective teleworkers would need additional qualifications relating to the ability to work outside the traditional office environment.

In determining whether a given job can be converted into a telework position, Stephen L. Schilling (1999) proposes a continuum of "teleworkableness." At one end of the continuum are certain types of work that can be easily converted into full-time telework which he calls “mobile work(ers)”. At the opposite end of the continuum are those jobs that cannot be converted into telework at all which he calls “non-telecommuters” work. In between the two poles are jobs that can be converted into full-time telework with some effort and those that can be converted into various degrees of part-time telework. He calls the former “full-time data work(ers)” and the latter “part-time telecommuter” jobs.

Mobile work includes jobs such as that of salespersons, technical customer service personnel, consultants and auditors. These workers are traditionally teleworkers since most of their time is spent at customers’ offices anyway. Mobile work can be easily converted into telework. The non-telecommuter work includes retail salespersons, laboratory technicians and other individuals who need face-to-face interaction with customers and co-workers. They can only perform their work in the traditional office.

The “full-time data work” includes managed care healthcare claims processors, insurance processors and credit card customer service personnel. These jobs can be done permanently at home as they would in traditional offices. Finally, there are those jobs that can only be performed on a part-time basis as telework. These are management and professional jobs that require some office resources and collaborative work.

The first step in attempting to adopt a telework program is to determine which jobs can be converted into telework positions. Any attempt to allow an employee to telework a job that does not lend itself easily to telework can result in failure. Similarly, converting jobs that can only be performed effectively as part-time telework into full time telework can also affect the design of the job and possibly lead to a decline in performance. For instance, resources that are needed in a given step in a chain of activities may only be available in the office. This will require the employee to put that step in the sequence on hold, do the subsequent sequential routine and then complete the earlier routine at a later time in the office, thus changing the original sequencing of the job. If the original sequencing is more efficient, which may be the case much of the time, then telework can redesign the job and make the new design less efficient.

Selection of Teleworkers

The traditional employee selection process involves the matching of skills of prospective employees with the skill requirements of jobs. When there is a match, the prospective employee is hired. The newly hired employee goes through a period of socialization when she confronts the possible dichotomy between her expectations about the job requirements, her co-workers and her boss, and reality (Robbins 1993). In addition, the test of compatibility between the values of the newly hired worker and the values of the organization takes place during the socialization process. If there is compatibility between the individual’s skills and values and the job requirements and values of the organization, the individual is retained and rewarded. If this compatibility is non-existent, the newly hired worker has two options. She may decide to stay or to quit. If she decides to stay, then she has to adjust to the values of the organization and learn what it takes to do the job effectively.

Hiring Teleworkers from outside the Organization

This traditional selection process may be tempered when the new hire is a teleworker. First, if a teleworker is to be hired from outside the organization, the process of socialization may be eliminated. This is so because the newly hired teleworker may not interact directly with members of the organization and will not be exposed directly to the norms and values of the organization to permit her to understand, internalize, and accept these norms and values. Neither will the employer be sufficiently exposed to the values of the teleworker. Whether the teleworker's values are in line with those of the firm will be difficult to ascertain. If there is lack of value-congruence, the process of forging the congruence will be difficult if not impossible. This lack of fit can have negative consequences for organizational performance. To recognize the importance of the socialization process, firms such as IBM require their newly hired virtual labor force to attend courses related to the internal workings of the organization (Bresnahan 1999 p. 7). Later, seminars are organized for them in their specific disciplines and they are assigned projects with other employees who have field experience. Sometimes newly hired teleworkers are assigned to mentors to help them understand the culture of the organization. While these efforts are meant to socialize the newly hired, it is not clear if they can replace the direct encounter stage of the traditional socialization process.

Hiring Teleworkers from within the Organization

To avoid problems associated with insufficient socialization, employers usually hire teleworkers from within the organization. Available evidence suggests that most successful teleworkers have worked for some time in the organizations before they change to telework status. Thus the teleworkers' market is typically an internal labor market. In this setting, the process of matching the job related skills with the job requirements and individual values with the organizational values has already occurred.

Employers would, however, need to ensure that those hired as teleworkers are trustworthy. Workers have to be trusted to keep the other side of the employment bargain. In addition to the skill and value congruence, and trustworthiness, managers may look for candidates with certain job-relevant characteristics including self-motivation, confidence, the ability to work independent of direct supervision, as well as those who have time management skills (Schilling 1999). Employees who lack self-motivation usually have difficulty setting routines and meeting deadlines when they are not directly supervised. Independent and confident workers are likely to do better without supervision, while those with time management skills will better be able to separate out home responsibilities from job responsibilities.

Finally, the literature suggests that teleworkers need other non-job-related skills that non-teleworkers doing the same job may not necessarily need. These include:

- being computer and communications technology literate;
- having the ability to speak clearly by encoding messages sent out effectively; and
- being a good listener who can decode messages effectively so that receivers can attach the right meanings to messages teleworkers send, and vice versa.

Supervision of Teleworkers

Traditional supervision involves establishing standards of performance for subordinates, directly monitoring the results, comparing the outcome to standards, and correcting deviations through coaching. This traditional approach to supervision usually takes place in environments where face-to-face encounters between the employee and the employer are used in most communication exchanges. In such face-to-face encounters, visual cues, gestures, facial expressions, and other non-verbal mechanisms, are used by both supervisors and subordinates to clarify meanings to actions. Such a medium of communication is non-existent in most telework environments. Recent technological innovation such as internet-videoconferencing is however making it possible to communicate in real time from remote locations. However, its use is limited to teleworkers who have access to computers and the internet. Moreover, some teleworkers do their work out of their cars, in the field, and in remote areas outside a home or a telework center so such facilities may not be readily available. Furthermore, the cost of the technology used, the extent to which users can be comfortable with the technology, and the possibility of technological failure, especially in the early trial stages, can prevent users from adopting these highly sophisticated technologies.

While the use of more sophisticated technology can mimic direct supervision in real time, in most cases remote management practices are used for supervising teleworkers. The appropriate principle of remote management requires supervisors to set objectives, criteria, deliverables, and deadlines for the work to be accomplished by the teleworker and to have the capacity to build trust of subordinates (Rotter 1999). Supervisors do not have the opportunity to observe subordinates performing their duties and in most cases do not communicate face-to-face. Remote supervision is not unique to telework. Similar remote management skills are required in familiar types of jobs such as managers of branch-office managers, supervisors of field workers, and clients of consulting firms.

The difference between telework and other remote work such as field-work is that telework is a strategic choice made usually by managers (Bresnahan 1988) and in some cases by the employees (AT&T Telework Webguide 2000). The choice is made for several reasons including cost-reduction, such as the IBM telework initiative in 1995, or as a retention tool or to create employee loyalty, such as the telework program launched by Merrill Lynch in 1998. If, for instance, the choice of telework is based purely on the need to create loyalty and to retain the best employees, then organizations may invest in sophisticated technologies. These sophisticated technologies can transform remote supervision into a real-time audio-visual encounter that will mimic the traditional face-to-face encounter.

If, on the other hand, the choice is based on using telework for reducing cost, expensive investment in the technology will not be an attractive option. This will require supervisors to use the remote supervisory processes that do not allow face-to-face encounters between employee and employer. In such situations, only the end results can be used to evaluate individual performance.

Even those who argue that remote management does not differ much from traditional management acknowledge that remote management requires managers to better understand their direct reports' personality traits, skills, and work styles (Krizov 2000). Managers of teleworkers may be expected to know the strengths, talents, and weaknesses of their direct reports and to see them performing literally with their mind's eyes. Furthermore, they may have to replace visual cues by simple but telling actions such as the time it takes for a direct report to reply to emails sent, or for her to return phone calls made to her by the supervisor. Because direct reports are not often seen by supervisors, they are evaluated based mostly on outcomes. Thus, evaluation of subordinates may be more objective since it does not include subjective factors such as charisma and charm.

Performance Evaluation

Performance evaluation is the formal systematic assessment of how well employees are performing their jobs in relation to established standards (French 1990). Performance evaluation is important to the employer as well as the employee. It provides the basis for compensation, promotion, training, and development. In the traditional performance evaluation process, managers rate employees on a set of individual behaviors and traits or characteristics that are related to job performance. For instance, rating scales with behavioral items such as thoroughness, quickness to grasp, interpret and adjust to instructions can be anchored ranging from "not acceptable" to "exceptional" and used to assess quality performance. Similarly, traits such as creativity, adaptability and innovativeness can be used to measure how effectively an individual utilizes resources. In this setting, managers rely on direct observation of employees as a way of gaining information about employee performance. Hence the use of observable behaviors and characteristics for such assessments (Westfall 1997). These behavioral and trait measures tend to be more related to the work process and are used because they correlate with performance.

In a telework environment, direct observation is not possible. However, the Transportation Management Association Group (1997) reports a study by Margaret Klayton that found that two-thirds of the companies surveyed evaluated teleworkers by the same standard procedures used to assess performance of non-teleworkers. Managers do not have direct knowledge about how remote employees go about their work. Managers may therefore need to move away from the behavioral or trait approaches of appraising performance. One alternative is to evaluate employees' performance by focusing on work outcomes such as productivity instead of work processes. In evaluating the performance of teleworkers, managers may need to find a way to measure the quality of work done by teleworkers as well as the number of project completions. To be successful in the evaluation process, managers and subordinates may have to jointly set clear performance objectives. These objectives have to identify specific tasks and behavioral objectives to be accomplished during the performance period. This will require that work be broken down into its component tasks, and that outcome measures be established. The measure could be a piecework count or simply counting the number of tasks finished within a give period of time. Where tasks require teleworkers to communicate with the office, electronic measures that can measure the inbound and outbound calls to remote employees can be installed on telecommunication equipment used in the home office. Finally, the objectives need to be prioritized by identifying those activities whose results are most critical and those that can be deferred.

Training

There appears to be substantial agreement that training of teleworkers and their managers is vital to the successful implementation and operation of teleworking. The training needed is general in nature, in that a good deal of it is transferable to jobs with other employers. Becker's model suggests that employers will provide training in instances where the skills are transferable only if the worker is willing to pay for or share in the cost of the training.[3] The payment exacted in most instances is receipt of a lower wage or salary than would otherwise be the case. Employers who wish to make teleworking cost-effective in their organizations must train both supervisors and employees with respect to the issues that arise in a teleworking context. If the Becker model is correct, we expect that both groups of workers will have lower earnings during this training period.

Supervisory training is expected to encompass several aspects of the challenges that confront management of remote workers. These include setting, monitoring, and enforcing performance standards; training in effective communication with remote workers; and problem resolution or troubleshooting. Crandall and Wallace (1998) suggest that managers who are prone to micromanaging will not be compatible as managers of teleworkers.[4] They predict that successful managers in the telework environment are more likely to be inclined to train, develop and trust employees and manage for results rather than attempting to manage employee input.[5]

Workers are likely to need training in various aspects of working remotely. For home-based workers, training about ergonomics, safety and liability issues, and techniques for generating cues to go to work, continue, and stop work may be important. Home-based workers and those working in remote sites away from home may also need instruction in goal-setting that is the basis of performance management. Workers must become adept at achieving clear understandings with their supervisors as to the performance objectives and goals involved with executing specific assignments or projects. They should learn how to effectively provide and receive feedback. As Nilles puts it, "The worker must accept responsibility for accomplishing the project, but the manager must ensure that the desired results and milestones are clearly and fully stated."[6]

Compensation

Traditional compensation schemes are composed of several elements: base pay, base pay progression, variable pay, benefits, and other (intangible) elements such as quality of life which may have a significant subjective component.[7]

Workers are paid based on the jobs they hold. Compensation for the jobs is determined by the use of a job evaluation scheme which sets the relative value of jobs in organizations on the basis of a comparison of a variety of job factors that are priced according to external labor markets. Responsibility, skill, effort, and working conditions are examples of factors that are commonly considered appropriate dimensions for determining relative job worth. Internally, jobs are arranged according to pay grades with minimum, midpoint, and maximum pay. Similar jobs are grouped together and sorted hierarchically by pay grade.

The base compensation is tied to a particular well-defined job that a person occupies. Base pay progression is accomplished through periodic pay increases tied to annual reviews, changes in the cost of living, and so forth. Significant achievement is rewarded by promotion to higher jobs in the hierarchy or through a substantial increase in pay. Variable pay, which is distinct from base pay and does not become a part of the base pay, includes incentive awards, bonuses, and recognition awards which are usually based on performance. Benefits include provision of health insurance, pensions, and retirement accounts.

There appears to be agreement that teleworkers should be compensated in the same manner as other employees. Some commentators make it clear that they believe for this to happen that compensation schemes need to be changed to adapt to the "new economy and the changed nature of work that telework and telecommuting represent. Some have argued that the work in the "new economy" (such as telework) calls for compensation based on worker skills or competencies rather than jobs (Crandall and Wallace 1998). In this scheme, base pay progression is determined by the skills or competencies the individual worker demonstrates having acquired from one period to the next.[8] Individuals are "banded" into a few broad pay bands that manage pay in steps from entry level to some target level based on the progress in acquiring relevant skills and competencies.[9] It is also anticipated that in telework employment, variable pay or pay based on performance or output will form an increasingly large portion of the pay package over time.

Implementation of a skills-based compensation system requires a good deal of assessment and supervisory input to operate successfully. At the same time, the telework environment by definition may offer more supervisory challenges because it involves considerably fewer (or at least different) opportunities to observe worker performance. The solution appears to be to structure work around defined objectives, with specified quality, time, effort, and cost criteria. Employees are then evaluated in relation to how well they meet the specified criteria and their pay is based on their output.

An output-based system involves certain difficulties. First is the difficulty of measuring performance or output, especially in jobs where there are no quantitative outcome measures. Second is the anxiety that adoption of such a scheme may cause workers due to the variable or fluctuating nature of their pay. While this may motivate some workers to work harder, it may also mean that workers may have to hedge by obtaining part-time work elsewhere to insure against a rainy day.

Efficiency Wages

Teleworkers may be selected out of a broader pool, or self-select themselves when the program is voluntary, because they have certain attributes that they or their employers believe will make them effective teleworkers. Because of their attributes and the need employers have for reliability and productivity, employers are willing to pay a wage premium hoping to attract suitably motivated workers. Alternatively, teleworkers may be paid the same nominal amounts as non-teleworkers, but because teleworkers' work-related costs will be lower for transportation, parking, child-care, clothing, meals, and other employment-related expenses, their effective compensation will exceed that of their non-teleworker counterparts.

In either case, employers will have an incentive to pay teleworkers higher nominal or effective compensation in order to tap the potential efficiency associated with teleworking. Teleworkers may thus generally be paid more than they could earn as non-teleworkers and generally be expected to produce more than they are being paid, thus generating a "surplus." This creates an opportunity for employees and employers to share the surplus in some fashion. While the sharing of this surplus or the payment of an efficiency wage makes economic sense because of its motivating effect, it can be seen by non-teleworkers as pay inequity and can have negative consequences for staff morale. Employers may find it helpful to share the surplus generated by teleworkers with their non-teleworker counterparts.

Conclusion

The number of teleworkers is increasing in the United States and has the potential to have profound effects on society at large and on organizations and their employees. Potential societal benefits include reduction in traffic congestion, reduction in pollution from vehicles, and as alternative work arrangements for the disabled. Potential organizational benefits include increased productivity, reduced expenses for office and parking space, reduced turnover costs, reduced sick leave and health costs, and elimination of absenteeism and tardiness. Individual employees also potentially gain from increased control over their personal lives, increased autonomy and responsibility in their jobs, reduction or elimination of emotional and monetary costs associated with commuting to work, and increased job satisfaction. However, the success of telework programs and the accrual of these gains depends on the effective implementation of appropriate programs and policies. Effective implementation includes, among other things, the adaptation of appropriate job analysis, staffing, supervision, training, performance evaluation, and compensation practices conducive to a telework environment.

Principles underlying traditional management practices may need to give way to principles based on remote management. First, job analysis may need to consider not only identification of the tasks involved, but also whether the job is location-dependent or teleworkable. Whether a job is teleworkable may influence the selection process used to hire workers to fill job positions. Selection may not be based only on matching job requirements with job related skills. The match may be between an expanded set of job requirements and an expanded set of job skills conducive to the telework environment. Expanded job requirements and job skills might include computer and communication technology competencies, effective communication skills, and other characteristics such as trustworthiness, self-motivation, confidence, and the ability to work independently of direct supervision.

Second, telemanagers may need remote management skills. They need to know strengths, talents, and weaknesses of their direct reports. Tele-managers have to use their mind's eyes to see what direct reports are doing. Visual cues may be replaced with actions such as the time it takes for direct reports to reply to emails or return phone calls. These require that both teleworkers and telemanagers be trained in the various aspects of working remotely. For home-based teleworkers, training may need to include ergonomics, safety and liability issues, techniques to facilitate switching from home to work, goal setting, and time management.

Third, telemanagers may also have to move away from using the same standard performance evaluation procedures that rely on behavioral and trait correlates of performance. Tele-managers may need to focus more on work outcomes or results in evaluating the performance of teleworkers. Evaluations based on results will require that tele-managers set objective performance standards with teleworkers and assess performance based on the realization of those standards. Economic theory suggests that in a telework environment, a skill- and results-based compensation system is likely to motivate workers to achieve even higher levels of performance.

Finally, though much has been written about telework and the effect it is having on the economy, the workplace, and levels of employee satisfaction, hard evidence on its effects is difficult to obtain. Numerous predictions about the nature of telework, teleworkers, and their compensation can be derived from incentive contract theory, hedonic wage theory, and human capital theory. In the compensation area alone there are some clear predictions that can be made, for example, as to the appropriate way to structure compensation to maximize productivity. Which of these predictions will be borne out in practice, and to what extent, is not known. Research that tests predictions derived from case studies and economic theory will be useful for policymakers, employers, and employees as they consider the opportunities that telework offers. [10]

End Notes

[1] Employer cost savings need to be offset against increased costs related to additional training, hardware, software, and operating costs for telecommunication and computer equipment, and facilities costs such as leasing, construction, and furniture. The results of a generic benefit-cost analysis of teleworking suggest that the breakeven level of increased productivity from telecommuting would not be justified for workers earning less than $21,000. According to Westfall (1998), assuming productivity gains of 10%, workers earning $21,000 to $23,000 per year would need to telecommute four or five days per week to justify costs. Two days per week telecommuting would be needed to justify costs for someone earning a salary around $40,000, and an employee with a salary in excess of $60,000 could justify the costs by telecommuting just one day per week.

[2] This study refers to increased “effectiveness” rather than productivity. It found that telecommuting employees rated themselves as 34% more effective while their supervisors rated them as only 10% more effective; Westfall, op. cit., p. 259. Measuring the productivity effects of telework is problematic for several reasons, not the least of which is the fact that selection bias may exist because more productive workers volunteer for telework assignments or are selected by employers. To the extent that this occurs, estimates of the effect of telework on productivity will be overstated.

[3] Gary Becker, *Human Capital*, 2d ed., National Bureau of Economic Research, 1975.

[4] Crandall and Wallace, op. cit., p. 65.

[5] Crandall and Wallace, op. cit., p. 57.

[6] Jack M. Nilles, *Managing Telework*, Wiley, 1998, p. 196.

[7] Alternative compensation schemes include pay for output (piece rate and commission), pay for time (salary), and hybrid schemes (merit-pay). Brown (1990) indicates that employers may choose a compensation scheme by attempting to balance the gains from tying pay to performance against monitoring costs.

[8] Crandall and Wallace are silent on the basis for setting base pay, but mention that workers may enter the "process" at an entry level of pay (p. 167). Assessing worker skills and competencies is not a trivial matter and probably accounts for the fact that pay systems that utilize this approach are not as prevalent as they might be. For example, the U.S. Office of Personnel Management has issued guidelines that allow federal agencies to adopt a performance-based compensation approach rather than traditional pay grade and step approach. The level of management resources needed to establish and operate such a scheme, particularly in a context where traditional compensation schemes are the norm, provides an explanation as to why federal agencies have opted to adopt this approach.

[9] The distinction between skills and competencies is not an obvious one. Some have counseled that too fine a distinction may suggest that skills are what blue-collar or manual employees are expected to demonstrate, while competencies are possessed by white-collar and managerial employees. Further, it has been suggested that, following Gary Becker's analysis, employers should not compensate for acquisition of skills and competencies that are general in nature but rather for those that are specific to the particular employment context (Crandall and Wallace p. 169).

[10] We are grateful to George Cave for his suggestions in this regard.

References

AT&T's Telework Webguide, "Not Always by Choice: Making Telework Work," http://www.att.com.

AT&T's Telework Webguide, "AT&T Survey Reveals Boomers Taking Control of Their Lives," http://www.att.com.

Gary Becker, *Human Capital*, 2d ed., National Bureau of Economic Research, 1975.

Jennifer Bresnahan, "Why Telework?" *CIO Magazine*, 1998.

Charles Brown, "Firm's Choice of Method Pay," in Ronald G. Ehrenberg (ed.), *Do Compensation Policies Matter?*, ILR Press (Cornell Press), 1990, pp. 165-182

N. Fredric Crandall and Marc J. Wallace, *Work and Rewards in the Virtual Workplace: A "New Deal" for Organizations & Employees*, AMACOM, 1998.

Diane Coursol and Jacqueline Lewis, “Cybersupervision: Close Encounters in the New Millennium,” http://www.cybercounsel.uncg.edu/manuscripts/cybersupervision.html, 1999.

William G. Deming, “Work at Home: Data from the CPS,” *Monthly Labor Review*, February 1994, pp. 14-20.

ETO (European Commission ACTS Program), “Telework (Telecommuting): The Benefits and Some Issues,” http://www.eto.org.uk, 2000.

FIND/SVP, “U.S. Telecommuting Trend Surpasses 11 Million,” http://www.etrg.findsvp.com, 1997.

Wendell French, *Human Resources Management*, 2d ed., Boston, MA: Houghton Mifflin Company, 1990.

Milton Harris and A. Raviv, “Optimal Incentive Contracts with Imperfect Information,” *Journal of Economic Theory*, Vol. 20, 1979, pp. 231-259.

Anne Hart, “How To Be A Telecommuting Pilot,” http://www.careermag.com.

Clair Krizov, “And How Do You Make Your Flower Grow? A Good Employee is a Good Employee, No Matter Where They Are,” AT&T Webguide, http://www.att.com.

Alan B. Krueger and Lawrence H. Summers, “Efficiency Wages and the Inter-Industry Wage Structure,” *Econometrica*, Vol. 50, 1988, pp. 259-293.

Edward P. Lazear, *Personnel Economics*, MIT Press, 1995.

Patricia Lynn Monkhtarian, “Defining Telecommuting,” *Transportation Research Record*, No. 1305, 1991, pp. 273-281.

National Research Council, *Research Recommendations to Facilitate Distributed Work*, Washington, D.C.: National Research Council, 1995.

Jack M. Nilles, *Managing Telework*, Wiley, 1998.

Stephen Robbins, *Organizational Behavior: Concepts, Controversies, and Applications*, 6th ed., Prentice Hall, Inc., 1993.

N. Rotter, “Management Issues in Telecommuting,” Paper presented at the Annual Meeting of the Transportation Research Board, Washington, D.C., 1998.

Sundel Research Inc., *Washington Telework Study*, Prepared for Washington State University Energy Program, 1999.

The Transportation Management Association Group, *Telemanagers Handbook*, Prepared for the Williamson County, Tennessee and the Tennessee Department of Economic and Community Development, 1997.

U.S. Department of Labor (Employment and Training Administration), *Dictionary of Occupational Titles*, 4th ed., Vol. 1, 1991.

Ralph D. Westfall, "The Microeconomics of Remote Work," in Magid Igbaria and Margaret Tan, *The Virtual Workplace*, Idea Group Publishing, 1998, pp. 256-287.

Comments by George Cave, Ph.D., *Senior Research Associate, Joint Center for Political and Economic Studies*

Introduction

Baffour's and Betsey's (B&B's) work is an important contribution to an emerging literature on the economics and psychology of telework. Most of the important issues addressed at the Xavier University symposium are mentioned somewhere in B&B. These comments are intended to put this paper in a broader context, by examining various perspectives from which one might think about evaluating teleworker performance. These comments also quibble with a few aspects of B&B's approach to concepts and measures of teleworker performance and compensation.

Evaluation Perspectives

There are several perspectives from which one might think about evaluating teleworker performance. Though they cite a few empirical results from studies with other viewpoints, B&B mainly take the perspective of firms making compensation decisions about individual teleworkers. B&B state that "The purpose of this paper is to catalogue the appropriate job analysis, staffing, supervision, training, and compensation practices needed for the effective implementation of telework in organizations." But compensation decisions about teleworkers presuppose prior decisions from other perspectives. You do not have to worry about evaluating teleworker performance until you have hired some teleworkers or converted some on-site employees to full or partial telework. Employers are much more likely to offer telework when there are strong incentives to do so in the tax system or elsewhere in the firm's environment. Thus the first quibble with B&B is that, by focusing so much on one perspective, they have missed some important issues in evaluating teleworker performance from ANY perspective.

Selection Bias

In order for telework to occur, employers must offer or require it and employees must seek or accept it. *Selection bias* occurs when the background characteristics of teleworkers are mistaken for the effect of telework on performance. WHO is teleworking really may be driving evaluation results that purport to measure WHAT telework does to performance. This bias may stem from employer decisions. For example, is telework a "perk" to reward trusted upper echelon managers whose performance already has been exemplary? In this case, estimates of the effect of telework may be inflated. The opposite may be true when managers use telework assignments to cut severance costs for contingent workers and marginal performers; telework may seem to fail when in fact it might enhance the performance of average workers.

This project was funded under a purchase order contract from the Office of the Assistant Secretary for Policy. Points of view or opinions stated in this document do not necessarily represent the official position or policy of the Department of Labor.

Selection bias also may come from self-selection. Are the first employees who seek out opportunities to telework those who have the highest levels of commitment to their jobs, despite long commutes, physical disabilities, or infant care responsibilities? Evaluation results then might be overly favorable to teleworking, and unreliable for predicting the effects of wider implementation of telework.

Normative Versus Positive Economics of Telework

The second quibble with B&B is their occasional use of normative rather than positive language when describing principles for compensating teleworkers. The use of words such as "must" and "should" lead the reader to wonder about the scientific basis for such prescriptive language. This is a problem that might be fixed easily by framing the compensation principles as observed BEHAVIOR of firms in their case studies, or as HYPOTHESES derived from viable economic or psychological models of organizational behavior. Sources of such hypotheses include work by economists on incentive contracts (see Holmstrom 1979 and Lazear 1995) and on hedonic wages (see Rosen 1974). Holmstrom and others have noted that employers are concerned about the quantity and quality of worker outputs (such as telemarketing calls completed per week or units sold per week) as well as the quantity and quality of worker inputs (time, effort, ability, skill, loyalty to the firm). Employers may try to set all wage and nonwage aspects of compensation (such as work location) to equate marginal revenues with marginal costs.

Compensation and Incentives

One of the key characteristics of telework is that it is much cheaper for tele-employers to monitor outputs than to monitor teleworker inputs. Especially if teleworkers mainly operate individually, rather than in teams that might raise free-rider and efficiency-wage issues, incentive contract models of telework thus would predict that, everything else equal, efficient contracts for telework would:

- tend to involve some variable commission or piece-rate pay (rather than payment only of stable wages for hours of work); or
- would entail constant absolute minimum performance standards (such as 500 calls completed per week and 50 units sold per week), with severe penalties for underperformance (see Harris and Raviv 1979).

Lack of a perfect correlation between observable performance and marginal net revenue may stem from factors over which teleworkers have no control (such as extended server downtime). Thus sometimes employers might tie compensation to measures of RELATIVE performance, rather than absolute performance, to reduce the influence of environmental factors that affect all members of a class of workers. However, to keep teleworkers within the domain of employees rather than independent self-employed subcontractors, there's a limit to how precisely absolute or relative standards of performance can be defined. According to Coase (1937), the difference between an employee and a subcontractor is that, to save on transaction costs, an employee has a long-term open-ended contract with an employer, while an independent subcontractor must re-negotiate terms in the near future, or cease doing business with the employer.

If incentive contracts between teleworkers and tele-employers were inflexible, they would have to be re-negotiated every time flexibility was required. Such renegotiation would add back the forgone transaction costs that may be the main reason an employer-employee relationship exists in the first place. Thus some teleworkers who are classified as employees and operate under strictly defined performance standards actually might more properly be seen as independent subcontractors, whose employment can be terminated on short notice when employers need flexibility in production. Conversely, some teleworkers who are classified as independent subcontractors may in fact be more like employees of "virtual sweatshops," with rather loosely-defined performance standards but few fringe benefits and inferior job rights.

Form of Pay: Cash or Noncash Benefits

Because remote work reduces teleworker expenses for commuting, childcare, business attire, lunches, and other items, telework may be considered a "location amenity" not subject to payroll taxes or agency budget caps. Employers who offer telework may save on occupancy, parking spaces, onsite childcare, and onsite concierge costs. These savings may outweigh the additional costs of equipping and training teleworkers, training their supervisors, dealing with possible bottlenecks (such as email backlogs), and possibly institutional memory loss. According to B&B, an employer's net cost in offering telework is measured by the "teleworkableness" of the jobs they've designed. These costs, and the importance of the wider pool of potential workers telework may attract, differ among employers.

Potential workers differ in their willingness to trade cash wages for the locational amenity of teleworking. Such differences in preferences may stem from variation in workers' disdain for micromanagement, or from variation in workers' social supports, fear of social isolation, "agoraphobia," boundaries between work and family life, fondness for "multitasking" work and "leisure" or household chores simultaneously, and in other potentially measurable characteristics that may seem tangential to the labor market. According to the theory of hedonic wages (see Rosen 1974), labor markets will tend to match workers who place high values on telework with employers who can offer it cheaply.

Because of possible wealth effects on effort and likely coverage through other earners in the household, efficient telework contracts between employers and employees also may be less likely to entail other noncash employment benefits such as sick leave and health insurance.

Training and the Timing of Pay

Finally, the training content of jobs may affect the timing of pay. If a firm invests in "specific human capital" for a new teleworker, such as instruction in idiosyncratic legacy technologies for communicating with supervisors, wage-tenure profiles may be higher and steeper than if new employees accept some of their compensation in the form of general, transferable training.

Conclusion

Many of the predictions of incentive contract theory, hedonic wage theory, and human capital theory generate testable hypotheses for the nature of telework. By infusing their paper with more of these hypotheses, and/or with more examples of actual work arrangements drawn from case studies, Baffour and Betsey could make a fine piece of work even better.

References

Ronald Coase, “The Nature of the Firm,” *Economica*, 4, 1937, pp. 386-405.

Milton Harris and Artur Raviv, “Optimal Incentive Contracts with Imperfect Information,” *Journal of Economic Theory*, 20, 1979, pp. 231-259.

Bengt Holmstrom, “Moral Hazard and Observability,” *Bell Journal of Economics*, 10, 1979, pp. 74-91.

Edward P. Lazear, *Personnel Economics*, Cambridge, MA: MIT Press, 1995.

Sherwin Rosen, “Hedonic Prices and Implicit Markets; Product Differentiation in Pure Competition,” *Journal of Political Economy*, 82, 1974, pp. 34-55.